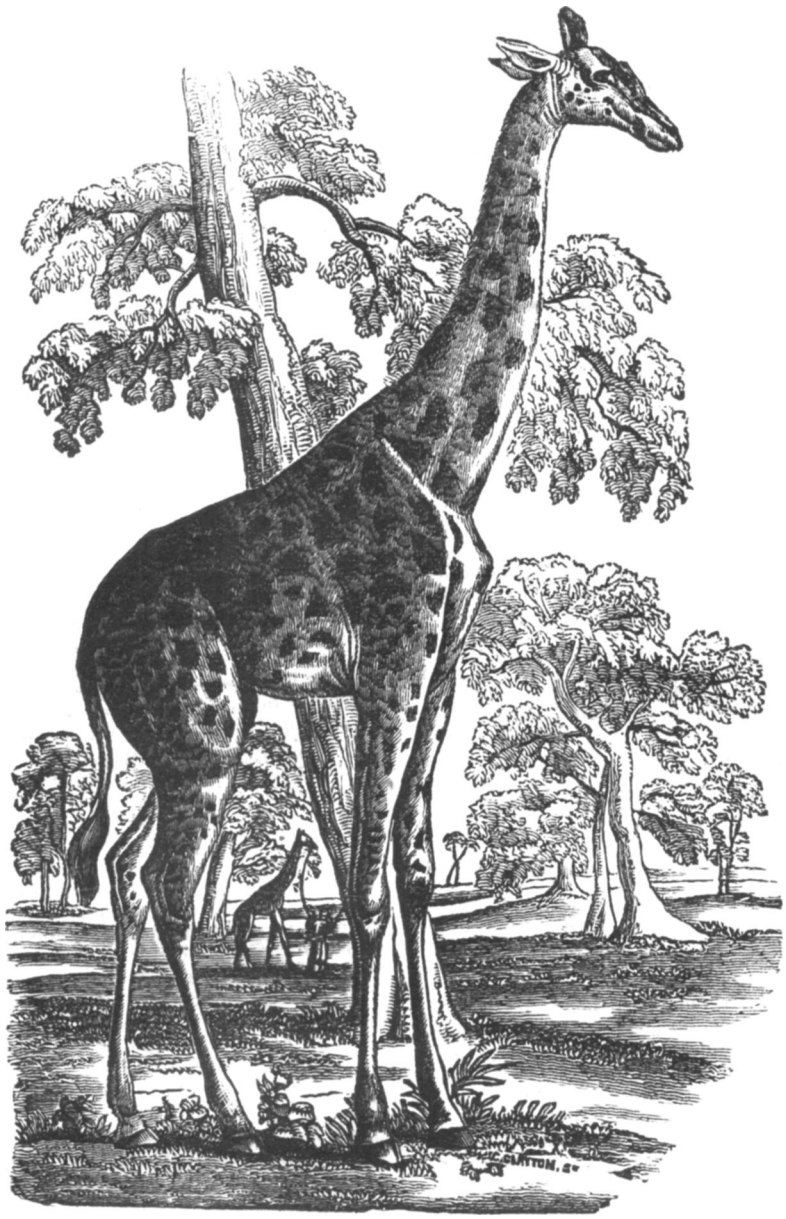
deer. To kill deer is looked upon as independence; one possessing a herd of a thousand deer, is talked of as a rich man and a few individuals are said to possess the extravagant, wealth of from fifteen hundred to two thousand.

"Several attempts have been made to introduce the rein-deer into this country, but yet without success, chiefly, it appears, from the improper selection of a place to which they might retire on their first landing."



THE CAMELEOPARD, OR GIRAFFE.

"Modern zoologists have considered that the northern and southern regions of Africa possessed separate species of this extraordinary animal. The foregoing figure is that of an animal from the north, taken in the vicinity of Senaar and Darfour; and the woodcut at the commencement of the description is also from the northern animals described by Ruppel; and as it is in this organ that the principal specific distinctions appear, it may serve for comparison with those from the southern part of the continent. (See page 186.)

"In both species, the immense length of neck, and the disproportional height of the fore-quarter, compared with the hinder, are the appearances which first strike an observer as unwieldy, clumsy, and unfitted for an active life. The food, however, is derived in a great measure from the foliage of trees, particularly a species of acacia (*Acacia Giraffæ*, Burch.) It seizes the herbage or foliage with its tongue, which is long and narrow, and which rolls round the object with a considerable degree of pliability, using it as a prehensile organ, and one beautifully fitted as an accessory to the other parts of its structure. The perfection of its form enables it to reach the exalted branches, which are uncropped, from being above the height of ordinary animals; and, on the other hand, a shorter neck would not have allowed it easily to reach the earth, in districts where wood was more unfrequent. Its pace is an amble, and, when put in motion, it is capable of considerable speed, according to Major Denham, such as to keep a horse at a pretty smart gallop. It occasionally falls a prey to the lion, the only beast of prey which dares to attack it; but the powerful strokes of both the fore and hind feet are sometimes an equal match in open combat. The height of the giraffe is from fifteen to twenty-one feet. The general colour is yellowish-white, patched

over with large square and irregularly formed spots, of a yellowish-brown or fawn colour, divided from each other by a narrow stripe of the pale ground colour, and represented among the antelopes by the appearance of the *Tragelaphus scripta*, and one or two others. The head is adorned with three prolongations of the bone, two of which, in the usual place of horns, are generally described as such. They are covered with a velvety skin similar to those of the deciduous horned deer at their first growth, but which does not fall off, and at the tip they are surmounted by some strong bristly hairs. In the adult, the internal structure is hard and solid; but in the young, Geoffroy St. Hilaire observed the appearance of a cellular centre, nourished by vessels. The third protuberance is in the centre of the skull, and appears as a rounded knob, and is of a very spongy texture. The cameleopard was seen by Denham and Clapperton in parties of five or six on the borders of Lake Tchad, and also met with and described by Ruppel in his Travels in North Africa; while those of the south are frequently mentioned in the Travels of Le Vaillant and Burchell.

"In a state of nature they are timorous, and flee immediately from danger, but in a state of domestication lose a great part of their timidity, become mild and docile, know their keeper, and take from the hand what is offered to them."

We may here passingly observe, that a very fine specimen of this singularly shaped animal may be seen in the Musuem of Trinity College, Dublin.

We are sorry to observe, that while the Plates in the present volume are superior to those in most of the preceding, there is a sad falling off in the letter-press department—we have seldom seen a more slovenly printed book.

ON THE CONSTRUCTION OF RAIL-ROADS.

As the subject of railroads through Ireland is one in which all must feel interested, we give the following discussion between two eminent individuals, relative to the proper construction of the various kinds of roads which may be required on a line;—

Dr. Lardner commenced by saying, that on account of the commercial and political consequences resulting from the formation of rail-roads, many questions with reference to them became important, although, considered in an isolated point of view, they might appear trifling. He had before stated, in his lecture at the Rotunda, that the perfection of a rail-road would be, to have it entirely and unqualifiedly level. If they wished to connect two points in a country by a rail-road, to do it in a perfect manner, a straight line ought to be drawn from one extremity to the other, and this line should be perfectly level. This state of perfection was not, however, attainable, and they were then obliged to consider with all due care, and take a balance of the advantages which any proposed line offered. He proposed to call the attention of the Section to the effects of declivities and curves upon a rail-road. Having been called some time ago before a committee of the House of Lords, to give evidence respecting two intended rival rail-roads, this led to an inquiry, the result of which at the moment startled him; but this soon vanished, and he only felt astonished at his own stupidity. Every road offers a sensible resistance to traction, but this on a rail-road is less, because the surface is more uniform. The resistance on a rail-road to the power of traction is always the same as the resistance produced by ascending an acclivity rising 1 foot in 250—that is, supposing the rail-road to be level. Suppose a rail-road rising 1 foot in 250, the resistance to traction then proceeds from two causes—the resistance on the level, as already explained, and the resistance offered from the actual acclivity. The resistance to be overcome on the level is equivalent to nine pounds per ton, and on the road ascending 1 foot in 250, it would be eighteen pounds per ton; and thus it is seen, that in the latter case the drawing power must exert twice the force necessary on the level. If the road rose 2 feet in 250, the drawing force would be twenty-seven pounds to the ton. This view of the subject is confined to ascents; but it should not be forgotten, that when a rail-road is worked, the transit is from one end to the other. It was necessary, in estimating the merits of rail-roads, to consider their action downwards as well as upwards. In coming down a steep, no force is required to impel an engine, and the gravity restores that force in going down which it has robbed from it in the ascent. You had to provide, in an ascent of 1 foot in 250, for a resistance of eighteen pounds to a ton, but descending, no force was required. If it was desired to strike an average between the ascent and descent, the road would present a surface which would be equivalent to a level. This point, respecting ascent and descent, struck the House of Lords as a paradox, but it was one only in sound and not in reality. He remarked that these observations referred to ascents not more steep than 1 foot in 250; but supposing the rise to be 3 feet in 250, and where the strain would be, consequently thirty-six pounds in each ton—would gravity give this back in the descent? It was true that no power was required in descending; but while only nine pounds were gained in the descent, twenty-seven pounds were lost in the ascent. Beside the loss of power, there was also the danger resulting from the too great velocity occasioned by sudden descents. In one of the lines of railway for which a bill had been applied for to the House of Lords, there was a slope of 1 foot in 106 in a descent of two miles and a half long, and the velocity given to an engine on arriving at the foot of the slope could not amount to less than 70 miles an hour. To mitigate defects arising from these abrupt descents, breaks were applied, but not always with success. The break is a piece of wood, pressed against the tire of the wheel by a lever, and if it acts with full effect it ought to prevent acceleration. He had seen several cases in which it had totally failed, and one instance which occurred he would detail. At one of the slopes between Manchester and Liverpool, he was descending with a loaded train of one hundred and fifty tons. The operative engineer, whether through a desire of displaying the rapidity of the engine's movements, or through neglect, did not apply the break at the commencement of the slope. When half way down, the velocity became so great, that he (Dr. Lardner) requested the breaks to be applied, but on doing so they were instantly burned. The train went down at a tremendous speed, although the supply of steam had been cut off. When the train had been stopped, it was found that the wheels of one of the waggons which revolved with the axis had been broken, and yet notwithstanding this accidental drag, the speed amounted to about fifty miles an hour. It was objectionable to have any slope exceeding one foot in two hundred and fifty, for when the excessive natural powers of gravitation were resorted to, control over its movements was impossible. The conclusion to be arrived at, although it appears paradoxical, is, that you may construct two rail-roads, say of one hundred miles in length, one level, the other going over mountains, and yet the two rail-roads may be worked by the same mechanical power. Suppose in the one you ascend one foot in two hundred and fifty, and descend in the same ratio, a pull of eighteen pounds to the ton is required only fifty miles, and on the other half you descend by inertia. On the level road a pull of nine pounds to the ton is required for the entire distance, and thus the extent of exertion is equalized. It was not to be forgotten that they should have a regard to the power used. If the power to be used was that of animals, then it might happen that the hilly road would be better than the level; for nothing was better understood than that a dead and unvarying pull upon the same set of muscles would have the effect of causing the labour to be more severe, while a varying pull would alternately give quiescence and exercise to the muscles. If the line was so disposed as to throw the whole ascent in one spot, the advantage would be gained of having the rest of the road nearly level. But the cost of attaining this advantage should not be forgotten. Steeps of this description required an increased power, and the engines capable of working on the general line of road, would not be capable of exerting an increased force. There were only two ways of performing sudden ascents, one by the agency of an additional engine, and the other, by having the whole